AUTOBODY

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INDUSTRIAL EDUCATION

Curriculum Guide

Alberta
EDUCATION
1982

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NOTE: This Curriculum Guide is a service publication only. The Senior High School Program of Studies contains the official statement concerning Senior High School courses. The information contained in the Guide is prescriptive insofar as it duplicates that contained in the Program of Studies. There are in the Guide, however, as well as content, methods of developing the concepts, suggestions for the use of teaching aids and lists of additional reference books.

Typing: Esther Pang

INDUSTRIAL EDUCATION

RATIONALE

Industrial Education is a program consisting of courses which provide a continuum of experiences, starting with exploratory activities in the junior high school and expanding in the high school to the development of skills related to career fields. This development of the student's skills is planned for through courses in industrial and vocational education culminating in on-the-job work experience, or entry into a job or post-high school institution for further education.

The program consists of courses ranging from those designed for an exploration of the technologies and trade areas to units of practical preparation for a career. In the process the courses develop the student's knowledge of himself, his talents and his skills.

For information on sequencing and course description, refer to the "Handbook In Industrial Education for Guidance to Teachers, Counsellors and Administrators".

PROGRAMS

There are two parts to the Industrial Education program. The first part consists of the I.E. 10, 20, 30 series of courses and is designed for career orientation. These courses were developed primarily for students in laboratories that utilize the multiple activity approach as found in most smaller schools, but they can be taught in unit shops as well.

The second part consists of the I.E. 12, 22, 32 series of courses and is intended for career development. The courses are planned for use in schools where facilities are available to teach specific occupational areas.

Students may progress from the I.E. 10, 20, 30 series to the 22 level courses upon meeting specified basic prerequisites or upon recommendation of their principal.

Both sections of the program focus on seven career fields. These are:

Visual Communications
Mechanics
Construction and Fabrication
Electricity-electronics
Personal Services
Performing Arts
Horticulture

The I.E. 10, 20, 30 courses consist of a number of one credit modules related to the career fields while the I.E. 12, 22, 32 courses consist of a number of five credit modules of specific occupational content. Completion of seven five credit modules qualifies the student for recognition by the Apprenticeship Branch for credit towards a journeyman's certificate.

It is left to the administrators of the school to offer the courses or combination of courses best suited to the needs and interests of the students and the financial resources of the district.

Courses offered at the 22 and 32 level have to meet special criteria for staff and facilities. The Industrial Education Consultant must authorize these in order to qualify the students for vocational grants.

OBJECTIVES OF INDUSTRIAL EDUCATION

The Industrial Education Program can help achieve the Goals of Schooling and Education. The course objectives are more focused and give direction to the teacher.

The objectives of Industrial Education are classified in three areas with the following purposes:

A. Personal Growth

To provide opportunities for the individual growth of the student through the development of acceptable personal and social values necessary in a productive society.

1. To provide a technical environment which motivates and stimulates individuals to discover their interests and develop personal and social responsibilities.

2. To assist in the development of positive attitudes toward safety.

3. To assist in the development of positive attitudes toward conservation and environment.

4. To assist in the development of consumer literacy.

B. Career Exploration:

To develop basic competencies, integrating cognitive and psychomotor skills to enter a family of occupations or post-secondary institutions for further education.

1. To provide exploratory experiences in the use of tools, equipment and materials appropriate to various technologies prevalent in a productive society.

2. To develop an understanding of the interrelationship of various technologies.

3. To provide a technical environment for students to synthesize their accumulated knowledge in the solution of practical problems.

4. To assist the student to develop habits that will be conductive to the establishment of a safe environment.

C. Occupational Skills:

To develop basic competencies, integrating cognitive and psychomotor skills related to families of occupations.

1. To provide safe exploratory experiences in the use of tools, energy, equipment and materials appropriate to various technologies prevalent in a productive society.

2. To develop an understanding of the interrelationships of various technologies.

3. To provide a technical environment which permits students to synthesize their accumulated knowledge in the solution of practical problems, and to assist students to develop habits that will be conducive to the establishment of a safe environment.

INDUSTRIAL EDUCATION 12, 22, 32 PROGRAM

INTRODUCTION

The Industrial Education 12, 22, 32 program is a series of modules which develop competencies leading to seven different career fields.

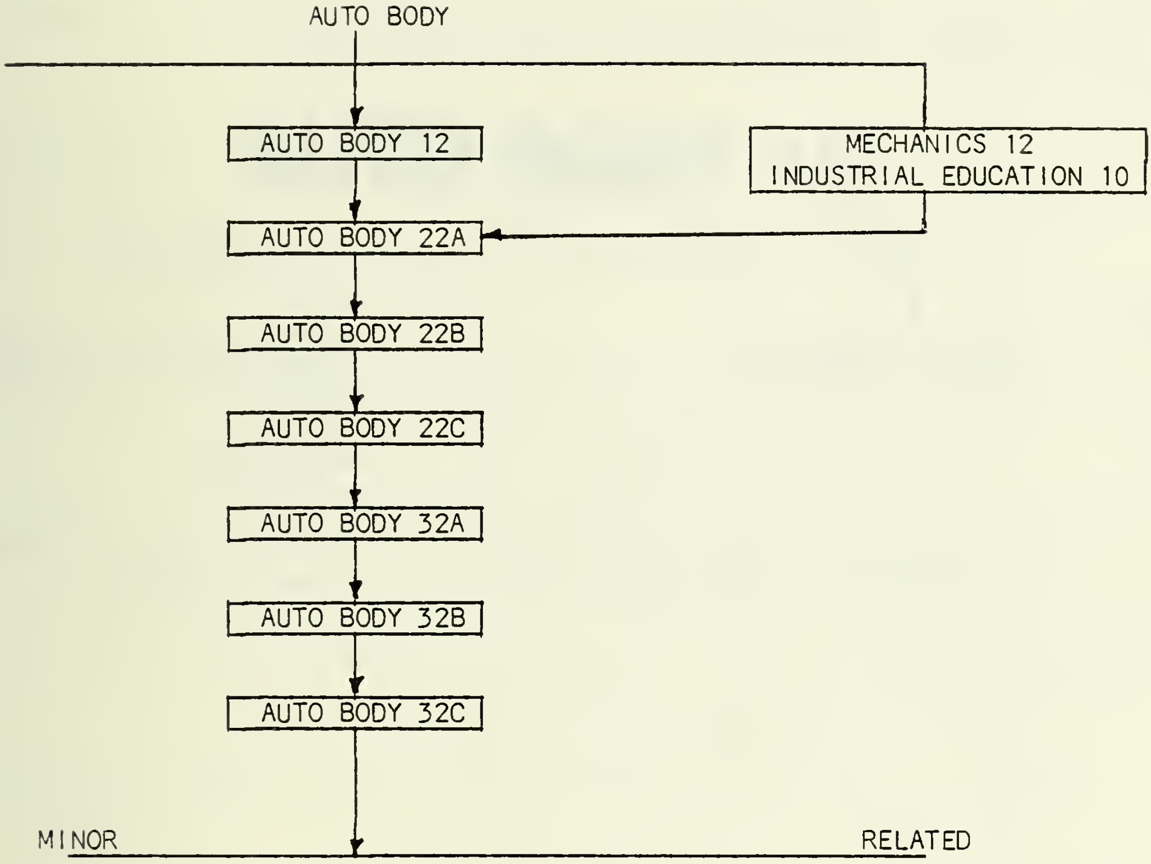
Entry into a career field may be gained by taking one of several introductory courses. These are:

1. the "12" course designated for each major, or
2. two modules from the Industrial Education "10, 20, 30" series related to the anticipated major, or
3. one half of a "12" course. The other half would be another half "12" or a module from the "10" program. The course would be recorded as Industrial Education "10".

Following the introductory course the student may advance to the major area of study by selecting any number of five credit modules from the courses designated as "22" or "32". The scheduling and sequencing of the modules is the responsibility of the local school personnel but must be in accordance with the regulations pertaining to prerequisites.

A student registered in a second or third level course ("22" or "32") is regarded as taking a major in that course area. Having established a major the student may select courses designated as minors and in this way broaden his practical skill base in a career field or even several career fields. However, students must complete all the preceding modules in a major series (usually six) before taking the 32C module (exception: Beauty Culture).

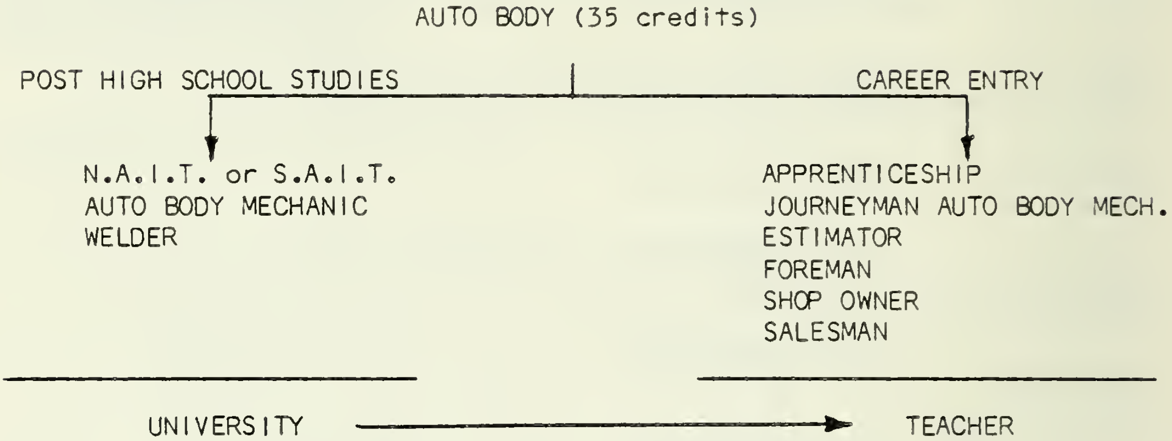
COURSE SEQUENCES



MINOR	RELATED
WELDING	INDUSTRIAL EDUCATION
SHEET METAL	BUSINESS EDUCATION
MACHINE SHOP	WORK EXPERIENCE
AUTOMOTIVES	
ELECTRICITY	

CAREER OPPOTUNITIES

Students having taken all or most of the modules in the Auto Body major may look forward to the following career areas:



AUTO BODY (35 credits)

POST HIGH SCHOOL STUDIES

N.A.I.T. or S.A.I.T.
AUTO BODY MECHANIC
WELDER

CAREER ENTRY

APPRENTICESHIP
JOURNEYMAN AUTO BODY MECH.
ESTIMATOR
FOREMAN
SHOP OWNER
SALESMAN

UNIVERSITY

TEACHER

AUTO BODY 12

COURSE CONTENT

AUTO BODY 12 (5 credits)

INTRODUCTION

Auto Body 12 introduces a student to the Auto Body trade. It is a general course giving an overview of the total area with minimal time for skill development.

OBJECTIVES

The purposes of Auto Body 12 are:

1. To give students an understanding of the Auto Body trade and related occupations.
2. To introduce students to the safe use of tools and acceptable procedures basic to the trade.

REFERENCES

*Hogg, Auto Body Repair and Refinishing

*Deroche & Hildebrand, The Principles of Auto Body Repairing and Refinishing

Crouse & Anglin, Automotive Body Repair and Refinishing

MacPherson, Collision Repair Guide

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* Refers to primary text.

CONTENT SUMMARY:

1. Career Field Occupations
   - employement opportunities
2. Introduction to Auto Body
   - body components
   - tools and equipment
   - interior and exterior car care
3. Safety
4. Shop operation
   - procedures, clean-up
5. Oxy-acetylene welding
   - equipment and procedures
6. Metal Finishing
   - tools, materials and processes
7. Painting
   - surface preparation
   - paint application

TOPIC: I CAREER FIELD STUDY

GENERALIZATION: A: There are many occupations within and related to the field of mechanics.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Career Field Occupations	The student will: - Read about the various occupations available in the career field and entry requirements. - List courses offered in his/her school system in the career field.		Apprenticeship Board speakers
2. Employment Opportunities - local - regional - national	- Discuss employment opportunities in his/her career choice.	4 hrs	
3. Trade Certification	- Explain journeyman certification requirements.		Apprenticeship Training Information brochures.
4. Trade Opportunities	- List the various occupations in and related to the Auto Body trade.		

NOTES:

GENERALIZATION: B: The Auto Body is made up of various components which may be damaged by collision, upset or corrosion. These are repaired in an Auto Body Shop.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Auto Body Components	The student will: - Identify the three divisions of the Auto Body, their components and functions: - front end assembly - unitized and conventional body - support system.		Hogg MacPherson Tait
2. Repairing Components - types of damage	- Identify the major causes of Auto Body damage and describe the general problems associated with the repair of each (collision, corrosion, fire and water).		Hogg Tait
3. Tools and Equipment Use	- Identify and use correctly various hand and power tools peculiar to Auto Body. - Identify major pieces of repair equipment (twist drills, hole saws, vises and clamps, chisels and punches, hacksaws, taps and dies, files, tapes and rules, wrenches, portable drill, bench grinder, drill press.	20 hours	Tait
4. Interior and Exterior Car Care	- Wash and polish a car. - Identify different kinds of upholstery.	3 hours	Hogg

NOTES:

GENERALIZATION: C: Unsafe acts and unsafe conditions often cause accidents which may lead to injury.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Unsafe Act	The student will: - List the consequences of unsafe acts particularly relating to: - hoists - jacking devices - jackstands - compressed air - eye injury - lifting - hot metal - sharp metal - hand tools - power equipment - welding equipment - horseplay.	2 hrs	Show Workers' Compensation films
2. Unsafe Conditions	- List possible unsafe conditions which might lead to injuries.		
3. Accident Reporting	- Explain purpose and use of accident report forms and use these when reporting an accident.		
4. Compensation	- Explain the function of and benefits available under the Workers' Compensation Act.		

NOTES:

TOPIC: IV SHOP OPERATION VAB 12

GENERALIZATION: D: A well run shop depends on organized procedures and a clean, safe environment.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Procedures	The student will: - Describe procedures to be followed in the Auto Body shop. - Analyze these procedures in order to increase efficiency.	3 hours	
2. Clean-up	- Participate in daily shop clean-up.	5 hours	

TOPIC: V OXY-ACETYLENE WELDING - INTRODUCTION VAB 12

GENERALIZATION: E: Oxy-acetylene equipment is used as a source of heat for various purposes including fusion of metals.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Parts	The student will: - Identify and explain the function of: - cylinders, regulators, gauges, hoses, fittings, torch, tip and goggles.		
2. Procedures	- Safely and correctly use the gas welding equipment for the following fusion operations on 18 or 20 gauge steel: - puddling - flat position - line of fusion - without rod - flat position - line of fusion with rod - flat position - weld coupons - flat position	35 hours	Hogg

TOPIC: VI METAL FINISHING

GENERALIZATION: F: Metal working and finishing are essential skills in Auto Body repair.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Tools and Processes	The student will: - Identify, explain the function of and correctly use the following tools and equipment to prepare metal for painting: - body hammers - dollies - body jack - spoons - picks - hooks - power abrasive tools - body file	30 hours	
2. Materials	- cold fillers		

NOTES:

TOPIC: VII PAINTING VAB 12

GENERALIZATION: G: The final finish depends on good surface preparation and proper paint application.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Surface Preparation	The student will:		
	- Describe the requirements for good adhesion and explain how the texture adhesion conflict is resolved.		
	- Identify and explain the use of various abrasives.		
	- Correctly use these abrasives when sanding painted surfaces for tooth and feathering, wet sanding, dry sanding and machine sanding prior to finishing.		
2. Painting - Undercoats	- Explain the composition, function and purpose of primer surfacer.	23 hours	
	- Apply primer surfacer to bare metal and filled surfaces.		
	- Sand primed surfaces for paint application.		
- Paint Application	- Disassemble, clean and re-assemble spray guns, identify parts and explain their function. (Demonstration only).		
	- Identify parts and explain function of hoses, gauges, regulators and filters.		
	- Correctly use spray equipment to apply finishing materials.		

AUTO BODY 22A

COURSE CONTENT

AUTO BODY 22A (5 credits)

INTRODUCTION

This course is open to any student who has completed Auto Body 12 or Industrial Education 10. Students will have an opportunity to use the tools and materials of the trade and begin developing an idea of the standards of skills required.

OBJECTIVES

The objectives of Auto Body 22A are:

1. To give the students an opportunity to learn trade terminology.
2. To give students an opportunity to learn the applications of various tools and skill in using them.

REFERENCES

*Hogg, Auto Body Repair and Refinishing

*Deroche & Hildebrand, The Principles of Auto Body Repairing and Refinishing

Crouse & Anglin, Automotive Body Repair and Refinishing

Venk, et al, Automotive Collision Work (3rd Edition)

Sargent, Automotive Sheet Metal Repair (2nd Revised Edition)

Lindey, K.R. Fundamentals of Auto Body Repair

* Refers to primary texts.

CONTENT SUMMARY:

1. Shop operation
    - trade terminology
    - tools
    - shop design

2. Auto Body Welding
    - metals

3. Metal Finishing
    - specialized treatment
    - use of heat
    - filling metal
    - painting

4. Trim and Hardware
    - interior trim
    - hinges

TOPIC: I SHOP OPERATION VAB 22A

GENERALIZATION: A: Efficient and safe shop operations depends on facility design, adequate tools and effective communication.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Trade Terminology	The student will: - Identify and describe: - major Auto Body parts - terms used in procedures - methods of procedure - major Auto Body problems	20 hours	
2. Tools	- Identify the kinds and describe the use of: - pliers - screwdriver - wrenches - socket sets.		
3. Shop Design	- Examine Auto Body shop plans and sketch a plan of a facility with careful consideration given to: - access doors - location and size of stalls - wash stall - spray booth - equipment layout - benches and cupboards - office and supply room.		

NOTES:

TOPIC: II AUTO BODY CONSTRUCTION VAB 22A

GENERALIZATION: B: Cost of Auto Body repairs is dependent on the design of the vehicle and assembly procedure.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Body component shaping - cold press - material	The student will: - Discuss the various shapes and bends that increase strength. - Describe the stamp and die process. - Describe the materials used in forming bodies.	20 hours	
2. Assembly - welding	- Describe the advantages of spot welding.		
- framing jigs	- Describe the use of jigs and their advantages.		
- mechanical fasteners	- Identify the types and sizes (metric and imperial) of: - nuts and bolts - machine screws - sheet metal screw - speed nuts - molding and trim fasteners - spring clips - hog rings		
3. Seat Construction - parts - styles - construction	- Describe: - the parts and different styles of seats - methods of fastening seats to the body.		

NOTES:

TOPIC: III ALIGNMENT THEORY AND APPLICATION VAB 22A

GENERALIZATION: C: Body alignment is basic to the handling and safety of a vehicle.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Methods of Alignment	The student will: - Discuss methods of alignment which include: - adjusting - shimming - bending - jacking - Explain the tolerance of fit. - Describe types of fasteners used: - spotted nuts - caged nuts - tapped caged plates.	10 hours	
2. Body Jack	- Discuss types: - hydraulic - friction. - Identify parts and functions.	10 hours	

NOTES:

TOPIC: IV AUTO BODY WELDING VAB 22A

GENERALIZATION: D: The Auto Body mechanic must have skill in using welding equipment.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Oxy-Acetylene Welding types - fusion welding - braze welding	The student will: - Make welds of the following kinds: - fusion welds - braze welds.	40 hours	
2. Types of Welding Joints	a. Define, draw diagrams and list applications of the following welds: - butt - lap - fillet - corner - flange - button hole.		
3. MIG Spot Welding	Learn the types of spot welding equipment and techniques of operation.		

NOTES:

TOPIC: V DOOR REPAIRS

GENERALIZATION: E: The condition of doors, hinges and locks is basic to their proper and safe operation.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Doors - removal - repair - painting	The student will: - Remove, repair and replace a door with consideration given to: - trim - handles - lock - glass and regulator - cleaning and lubricating lock - replacement of parts. - Practice bumping, dinging, picking and filing low crown metal. - Practice using cold filling. - Practice using hot filling. - Paint a door: - mask - sand - prime - top coat - clean-up.	40 hours	

NOTES:

AUTO BODY 22B

COURSE CONTENT

AUTO BODY 22B (5 credits)

INTRODUCTION

Students may register in Auto Body 22B following completion of Auto Body 22A.

OBJECTIVES

The objectives of Auto Body 22B are:

1. To give students an opportunity to develop skills in shaping Auto Body parts.

2. To give students an opportunity to develop and practice skills in Auto Body welding.

REFERENCES

*Hogg, Auto Body Repair and Refinishing

*Deroche & Hildebrand, The Principles of Auto Body Repairing and Refinishing

Crouse & Anglin, Auto Body Repair and Refinishing

MacPherson, Collision Repair Guide

Toboldt, Auto Body Repairing and Refinishing

Schmidt, Auto Body Repair and Refinishing

Venk, et al, Automotive Collision Work

Sargent, Automotive Sheet Metal Repair

Lindey, K.R., Fundamentals of Auto Body Repair

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* Refers to primary text.

CONTENT SUMMARY:

1. Auto Body Construction
   - body component shaping
   - assembly
2. Alignment Theory and Application
   - methods of alignment
3. Auto Body Welding
   - oxy-acetylene welding
   - joints
4. Door Repair

TOPIC: I INTRODUCTION TO ALIGNMENT

GENERALIZATION: A: The correct position of components in relation to each other is important for the operation and proper function of each.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Analysis of damage	The student will: - Detect misaligned components such as: - headlights - fenders - bumpers - wheel clearance in fenders.	10 hours	
2. Alignment	- Check body components for: - spacing - overlap - protusion. - Construct templates to check curves and intricate bends by obtaining the pattern from undamaged vehicles of the same year and model. - Discuss types of devices for comparison measurement.		

NOTES:

TOPIC: II AUTO BODY WELDING VAB 22B

GENERALIZATION: B: The Auto Body mechanic must have skill in Welding.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Metals	The student will: - Identify and describe the characteristics of commonly used metals in the automotive industry. - lead - white metal - aluminium - copper - steel - low and high carbon - alloyed - mild - cast iron.	45 hours	
2. Welding	Review welding equipment and procedures. Characteristics and procedures for controlling heat expansion and contraction of metals when welded.		Hogg Chapter 7

NOTES:

GENERALIZATION: C: Metal working and finishing are essential skills in Auto Body repair.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Specialized treatment	The student will: - Make edge repairs. - Restore damaged design lines.	45 hours	
2. Use of heat	- Use heat to shrink metal. - Use heat to forge metal. - Normalize metal.		
3. Filling metal	- Hot fill aluminum and mild steel metal by tinning, wiping, paddling and finishing body solder. - Cold fill metal by mixing and applying polyester resins.		
4. Painting	- Identify four types of paint used in Auto Body work: - lacquers - enamels - acrylics - polyurethane. - Prepare metal for painting. - Prepare paint for spraying. - Be aware of the inherent health and safety problems that exist in automotive painting.		

NOTES:

TOPIC: IV AUTO BODY TRIM AND HARDWARE VAB 22B

GENERALIZATION: D: Interior trim is used to give the automobile a more finished appearance by covering up the various methods of fastening materials at joints and edges.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES

1. Interior trim	The student will:
	- Identify, remove and examine:
	  - interior door trim panels
	  - interior quarter panels
	  - pillar facing
	  - kick pads
	  - arm rests
	  - garnish moldings.
	- Repair and replace components using appropriate fasteners:
	  - panel clips
	  - sheet metal screws
	  - spring clips
	  - tapered compression springs.
	- Headliners - types and method of fastening.
		10 hours	

2. Hinges	- Identify, examine and replace damaged hinges on:
	  - doors
	  - deck lid
	  - hood.
		5 hours	

NOTES:

AUTO BODY 22C

COURSE CONTENT

AUTO BODY 22C (5 credits)

INTRODUCTION

Students must have completed Auto Body 22B before registering in this course.

OBJECTIVES

The objectives of Auto Body 22C are:

1. To give students an opportunity to learn about the management component of a business.
2. To give students practice in the repair function of the Auto Body trade.

REFERENCES

*Hogg, Auto Body Repair and Refinishing

*Deroche & Hildebrand, The Principles of Auto Body Repairing and Refinishing

Crouse & Anglin, Automotive Body Repair and Refinishing

MacPherson, Collision Repair Guide

Toboldt, Auto Body Repairing and Refinishing

Venk, et al, Automotive Collision Work

Sargent, Automotive Sheet Metal Repair

* Refers to primary texts.

CONTENT SUMMARY:

1. Management in the Auto Body trade
2. Automotive plastics
   - identification and repair
3. Bumper Repair
4. Skill development for vehicle repair
   - aligning
   - welding
   - finishing
   - filling
   - painting

GENERALIZATION: A: An understanding of shop management, employer-employee relations and labour unions is important to employees in the trade.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Management	The student will:	5 hours	
- overhead	- Describe the function of the elements listed below in the operation of a business: - location - rent and utilities - advertising - supplies and parts - licensing and taxing.		
- personnel	- Discuss: - payroll deductions - wages and labour rates - Workers' Compensation.		
- bookkeeping	- Discuss: - necessity of keeping books - profits - gross - net.		
2. Labour Relations	- Describe the: - apprenticeship system - unions involved in Auto Body. - Discuss problems related to employee-employer relationships.	3 hours	

NOTES:

TOPIC: II AUTOMOTIVE PLASTICS VAB 22C

GENERALIZATION: B: The Auto Body mechanic must be able to identify and repair Auto Body plastics.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Recognition of various types of plastics	The student will: List the types of plastics presently in use.	15 hours	
2. Safety	- Must be aware of the hazards involved in working with plastics.		
3. Repair of Plastics	- Welding. - Filling. - Refinishing.		

TOPIC: III BUMPERS AND BUMPER REPAIR VAB 22C

GENERALIZATION: C: The Auto Body mechanic must understand the relationship of function and appearance in automobile bumpers.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Bumper Repair	The student will: - Identify the types and designs of bumpers. - Identify the parts of a bumper assembly.	15 hours	
2. Frame Horn Repair	- Given a damaged bumper: - disassemble - check frame alignment and make corrections - replace reconditioned bumper.		

TOPIC: IV VEHICLE REPAIR VAB 22C

GENERALIZATION: D: The skillful Auto Body mechanic works quickly and accurately.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Setting up and Aligning 2. Welding 3. Finishing 4. Hot Filling 5. Painting	The student will develop skills as applicable.	87 hours	

NOTES:

AUTO BODY 32A

COURSE CONTENT

AUTO BODY 32A (5 credits)

INTRODUCTION

This module introduces students to estimating the cost of repairs and further develops their skills in finishing and painting.

OBJECTIVES

The objectives of Auto Body 32A are:

1. To give students an opportunity to learn how to estimate the cost of repair work.
2. To give time for practice to develop skills.

REFERENCES

*Hogg, Auto Body Repair and Refinishing

*Deroche & Hildebrand, The Principles of Auto Body Repairing and Refinishing

Crouse & Anglin, Auto Body Repair and Refinishing

MacPherson, Collision Repair Guide

Toboldt, Auto Body Repairing and Refinishing

Venk, et al, Automotive Collision Work

Sargent, Automotive Sheet Metal Repair

Lindey, K.R., Fundamentals of Auto Body Repair

* Refers to primary texts.

CONTENT SUMMARY:

1. Estimating Auto Body damage.

2. Painting equipment and the spray booth.

3. Auto Body alignment .
   - shaping and aligning components - doors, trunk lid, decks, glass.

4. Metal finishing
   - picking and filing
   - filling - metal and plastic
   - abrasives.

5. Live repairs.

TOPIC: I ESTIMATING AUTO BODY DAMAGE

GENERALIZATION: A: A knowledge of work orders and estimate forms used in Auto Body help to understand the body mechanics' routine.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Types of Estimate	- Differentiate the following: - courtesy estimate - non-competitive estimate - competitive estimate.	10 hours	
2. Forms (Work Order and Estimate)	- Study standard work orders and estimate forms. - Study personalized forms. - Study pre-delivery check sheet.		
3. Assessing Damage	- Identification of parts. - Cost of parts (new and used). - Labour costs: - flat rate - educated guess. - Sublet item costs.		
4. Estimating	- Given a damaged vehicle: - estimate repair costs - determine value of vehicle - decide whether to repair.		

NOTES:

TOPIC: II PAINTING EQUIPMENT AND THE SPRAY BOOTH VAB 32A

GENERALIZATION: B: Spray finishing is an essential operation in the rebuilding of automobile bodies.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Spray Painting Equipment	The student will: - Identify and demonstrate the skills required to maintain and operate the air supply system: - compressor systems - air lines - transformers and regulators. - Identify, maintain and operate spray guns: - suction types - pressure feed. - Correctly use personal safety devices.	15 hours	
2. Spray Booth	- Visit various body shops and sketch the layout of their spray booth. - Survey the literature available. - Write an essay identifying and specifying the inherent health and safety problems that exist in automotive painting.		
3. Drying	- Explain advantages of force drying. - Explain the use of heat lamps. - Explain the use of additives in finishing materials to force dry.		

TOPIC: III AUTO BODY ALIGNMENT VAB 32A

GENERALIZATION: C: The correct position of components in relation to each other is important for the operation and proper function of each.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Shaping and Aligning	The student will:	20 hours	
- Components	- Shape and align damaged components to their respective openings by taking into account both contour and spacing.		
- Doors	- Align a door.		
- Trunk lid	- Align a trunk lid.		
- Decks	- Align a deck lid.		
- Glass	- Align an opening and install a windshield.		
2. Roughing out Damaged Areas	- Pull out low spots using: - slide hammer - pull rods - sweat plates, clamps and tension pull.		

NOTES:

TOPIC: IV METAL FINISHING VAB 32A

GENERALIZATION: D: The Auto Body mechanic must restore the automobile body to its original condition.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Picking and Filing	The student will: - Restore body damage to original contours using pick hammer and file.	40 hours	
2. Filling - metal fill - plastic fill	- Patch Auto Body parts by: - cutting back a rusted or damaged area - welding or brazing in good metal - filling and finishing.		
3. Abrasives	- Identify and use abrasives and tools for metal finishing.		

TOPIC: V: LIVE REPAIRS VAB 32A

GENERALIZATION:

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Restoration	The student will: - Repair, finish and paint: - fender - door - deck lid - hood.	40 hours	
2. Finishing	- Do a major paint job.		

AUTO BODY 32B

COURSE CONTENT

AUTO BODY 32B (5 credits)

INTRODUCTION

This module expands on previously learned skills and introduces auxiliary systems such as electrical wiring.

OBJECTIVES

The objectives of Auto Body 32B is to give students an opportunity to enhance their skills through practice by doing a job from estimating to counting up the final bill.

REFERENCES

*Hogg, Auto Body Repair and Refinishing

*Deroche & Hildebrand, The Principles of Auto Body Repairing and Refinishing

Crouse & Anglin, Auto Body Repair and Refinishing

MacPherson, Collision Repair Guide

Toboldt, Auto Body Repairing and Refinishing

Venk, et al, Automotive Collision Work

Sargent, Automotive Sheet Metal Repair

Lindey, K.R., Fundamentals of Auto Body Repair

* Refers to primary texts.

CONTENT SUMMARY:

1. Auto Body electrical
   - circuits
   - headlight aiming

2. Painting

3. Frames and Alignment
   - frame straighteners
   - wheel alignment

4. Welding
   - braze welding
   - MIG welding

5. Interior repair
   - glass installation
   - care and cleaning

TOPIC: I AUTO BODY ELECTRICAL VAB 32B

GENERALIZATION: A: A knowledge of office practices as they relate to writing up estimates and work orders is part of the Auto Body mechanics' routine.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Basic Electricity	The student will: - Understand basic concepts of current, voltage and resistance. - Electric circuits. - Use simple test equipment.	10 hours	
2. Safety	- Use safe practices in servicing batteries, repairing electrical circuits and replacing components.		
3. Batteries	- Properly charge a battery. - Properly boost-start a car. - Be aware of safety hazards and be able to perform emergency treatment of battery explosions and acid burns.		
4. Headlight Aiming	- Aim headlights using: - machine method - wall method.		

NOTES:

GENERALIZATION: B: The final finish depends on good surface preparation and proper paint application.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES

1. Technical Information	The student will:
	- Collect technical information from major paint companies' manuals and reference books.
	- Study factory codes for colours.
	- Identify code locations:
	  - door frames
	  - cowls.
		45 hours	

2. Mixing Paint	- Use a formula manual to mix paint and drier.		

3. Typing of Paint	- List the basic characteristics of:
	  - lacquer
	  - enamel
	  - acrylic
	  - polyurethane.		

4. Painting	- Apply paint to an Auto Body. - Compound and polish a paint job as required.		

NOTES:

GENERALIZATION: C: The correct position of components in relation to each other is important for the safe operation and proper function of each.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Frames	The student will: - Describe various types of frames used. - Identify the parts of a frame.	15 hours	
2. Frame Straighteners	- Evaluate need for this type of equipment. - Describe different types of frame straighteners listing advantages.		
3. Wheel Alignment	- Describe types of equipment. - Explain general theory of wheel alignment. - Using available equipment, align the wheels of a car.		

NOTES:

TOPIC: IV WELDING VAB 32B

GENERALIZATION: D: Welding is an important skill for the Auto Body mechanic to have.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Joints	The student will: - Weld light coupons held in various positions utilizing various joints.	45 hours	
2. Braze Welding	- Make patches, laps, cut out and replace metal.		
3. MIG Welding	- Name the types of welders. - List advantages of various types. - Identify types of wire and gases appropriate for special jobs. - Make live repairs.		

TOPIC: V AUTO BODY INTERIOR VAB 32B

GENERALIZATION: E: Proper installation of auto glass and interior trim are important for safety and appearance.

CONCEPTS/SUBCONCEPTS	LEARNING TASKS	HOURS	REFERENCES
1. Glass Installation	The student will: - Install windshields and side glass.	10 hours	
2. Care and Cleaning	- Be aware of the various products used for cleaning interior trim.		

AUTO BODY 32C

COURSE CONTENT

AUTO BODY 32C (5, 10 credits)

INTRODUCTION

This last module in Auto Body is open to students who have completed 30 credits in the subject.

OBJECTIVES

The 125 or 250 hours of time available in this module may be used to:

a. Provide more time to practice skills in content taken previously. Individual students, groups of students or the whole class may elect to study an area in depth. This could be the use of plastics in automotives, aligning, painting or any of the content areas covered in the auto body sequence.

b. Engage in actual construction work supervised by the Auto Body teacher or a work study coordinator and a journeyman on the job.

c. Further preparation for students planning to enter apprenticeship.

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